

MLLNVLRICI	IVCLVNDGAG	KHSEGRERTK	TYSLNSRGYF	40
RKERGARRSK	ILLVNTKGLD	EPHIGHGDFG	LVAELFDSTR	80
THTNRKEPDM	NKVKLFSTVA	HGNKSARRKA	YNGSRRNIFS	120
RRSFDKRNTE	VTEKPGAKMF	WNNFLVKMNG	APQNTSHGSK	160
AQEIMKEACK	TLPFTQNIVH	ENCDRMVION	NLCFGKCISL	200
HVPNQDDRNN	TCSHCLPSKF	TLNHLTLNCT	GSKNVVKVVM	240
MVEECTCEAH	KSNFHQTAQF	NMDTSTTLHH		270

Figure 1. Deduced amino acid sequence of *Xenopus cerberus* protein. SEQ ID NO:1.

Figure 2. Nucleotide sequence of the full-length cerberus DNA derived from the *Xenopus* organizer. The sense strand is on top (in the 5' to 3' direction) and the antisense strand on the bottom line (on the opposite direction). SEQ ID NO:2.

GAATTCCCAG CAAGTCGCTC AGAAACACTG CAGGGTCTAG ATATCATACA ATGTTACTAA	60
CTTAAGGGTC GTTCAGCGAG TCTTTGTGAC GTCCAGATC TATAGTATGT TACAATGATT	
ATGTAATCAG GATCTGTATT ATCGTCTGCC TTGTGAATGA TGGAGCAGGA AAACACTCAG	120
TACATGAGTC CTAGACATAA TAGCAGACGG AACACTTACT ACCTCGTCCT TTTGTGAGTC	
AAGGACGAGA AAGGACAAAA ACATATTTCAC TTAACAGCAG AGGTTACTTC AGAAAAGAAA	180
TTCTGCTCTT TTCTGTTTTT TGTATAAGTG AATTGTCGTC TCCAATGAAG TCTTTTCTTT	
GAGGAGCAGC TAGGAGCAAG ATTCTGCTGG TGAATACTAA AGGTCTTGAT GAACCCACAC	240
CTCTCGTGC ATCTCGTTC TAAGACGACC ACTTATGATT TCCAGAACTA CTTGGGGTGT	
TTGGGCATGG TGATTTTCGC TTAGTAGCTG AACTATTTGA TTCCACCAGA ACACATACAA	300
AACCGTACC ACTAAAAGCG AATCATCGAC TTGATAAACT AAGGTGGTCT TGTGTATGTT	
ACAGAAAAGA GCCAGACATG AACAAAGTCA AGCTTTTCTC AACAGTTGCC CATGGAAACA	360
TGTCTTTTCT CGGTCTGTAC TTGTTTCAGT TCGAAAAGAG TTGTCAACGG GTACCTTTGT	
AAAGTGCAAG AAGAAAAGCT TACAATGGTT CTAGAAGGAA TATTTTTCTT CGCCGTTCTT	420
TTTCACGTTT TTCTTTTCGA ATGTTACCAA GATCTTCCTT ATAAAAAGGA GCGGCAAGAA	
TTGATAAAG AAATACAGAG GTTACTGAAA AGCCTGGTGC CAAGATGTTT TGGAAACAATT	480
AACTATTTTC TTTATGTCTC CAATGACTTT TCGGACCACG GTTCTACAAG ACCTTGTTAA	
TTTTGGTTAA AATGAATGGA GCCCCACAGA ATACAAGCCA TGGCAGTAAA GCACAGGAAA	540
AAAACCAATT TTACTTACCT CGGGGTGTCT TATGTTCCGT ACCGTCATTT CGTGTCTTTT	
TAATGAAAGA AGCTTGCAAA ACCTTGTTTT TCACTCAGAA TATTGTACAT GAAAAGTGTG	600
ATTACTTTCT TCGAACGTTT TGAACAAAA AGTGAGTCTT ATAACATGTA CTTTTGACAC	
ACAGGATGGT GATACAGAAC AATCTGTGCT TTGGTAAATG CATCTCTCTC CATGTTCCAA	660
TGTCCTACCA CTATGTCTTG TTAGACACGA AACCATTAC GTAGAGAGAG GTACAAGGTT	
ATCAGCAAGA TCGACGAAAT ACTTGTTCCT ATTGCTTGCC GTCCAAATTT ACCCTGAACC	720
TAGTCGTTCT AGCTGCTTTA TGAACAAGGG TAACGAACGG CAGGTTTAAA TGGGACTTGG	
ACCTGACGCT GAATTGTAAT GGATCTAAGA ATGTAGTAAA GGTGTGTCAT ATGGTAGAGG	780
TGGACTGCGA CTTAACATGA CCTAGATTCT TACATCATTT CCAACAGTAC TACCATCTCC	
AATGCACGTG TGAAGCTCAT AAGAGCAACT TCCACCAAAC TGCACAGTTT AACATGGATA	840
TTACGTGCAC ACTTCGAGTA TTCTCGTTGA AGGTGGTTTG ACGTGTCAA TTGTACCTAT	
CATCTACTAC CCTGCACCAT TAAAGGACTG CCATACAGTA TGGAAATGCC CTTTGTGTTG	900
GTAATGATG GGACGTGGTA ATTTCTGTAC GGTATGTCAT ACCTTTACGG GAAAACAACC	
AATATTTGTT ACATACTATG CATCTAAAGC ATTATGTTGC CTTCTATTTT ATATAACCAC	960
TTATAAACAA TGTATGATAC GTAGATTTTC TAATACAACG GAAGATAAAG TATATTGGTG	
ATGGAATAAG GATTGTATGA ATTATAATTA ACAAATGGCA TTTTGTGTAA CATGCAAGAT	1020
TACCTTATTC CTAACATACT TAATATTAAT TGTTTACCGT AAAACACATT GTACGTTCTA	

CTCTGTTCCA	TCAGTTGCAA	GATAAAGGC	AATATTGTT	TGACTTTTTT	TCTACAAAT	1080
GAGACAAGGT	AGTCAACGTT	CTATTTTCCG	TTATAAACAA	ACTGAAAAAA	AGATGTTTTA	
GAATACCCAA	ATATATGATA	AGATAATGGG	GTCAAAACTG	TTAAGGGGTA	ATGTAATAAT	1140
CTTATGGGTT	TATATACTAT	TCTATTACCC	CAGTTTGGAC	AATTCCCAT	TACATTATTA	
AGGGACTAAG	TTTGCCCAGG	AGCAGTGACC	CATAACAACC	AATCAGCAGG	TATGATTTAC	1200
TCCCTGATTC	AAACGGGTCC	TCGTCACTGG	GTATTGTTGG	TTAGTCGTCC	ATACTAAATG	
TGGTCACCTG	TTTAAAAGCA	AACATCTTAT	TGGTTGCTAT	GGGTACTGC	TTCTGGGCAA	1260
ACCACTGGAC	AAATTTTCGT	TTGTAGAATA	ACCAACGATA	CCCAATGACG	AAGACCCGTT	
AATGTGTGCC	TCATAGGGGG	GTTAGTGTGT	TGTGTACTGA	ATAAATTGTA	TTTATTTTAT	1320
TTACACACGG	AGTATCCCCC	CAATCACACA	ACACATGACT	TATTTAACAT	AAATAAAGTA	
TGTTACAAAA	AAAAAAA					
ACAATGTTTT	TTTTTTTT					

Fig. 2. (Continuation page 2, SEQ ID NO:2).

MSRTRKVDL LLLAIPGLAL LLLPNAYCAS CEPVRIPMCK SMPWNMTKMP NHLHHSTQAN 60  
AILAIEQFEG LLTECSQDL LFFLCAMYAP ICTIDFQHEP IKPCKSV CER ARAGCEPILI 120  
KYRHTWPESL ACEELPVYDR GVCISPEAIV TVEQGTDSMP DFSMDSNNGN CGSGREHCKC 180  
KPMKATQKTY LKNNYNYVIR AKVKEVKVKC HDATAIVEVK EILKSSLVNI PKDVTLYTN 240  
SGCLCPQLVA NEEYIIMGYE DKERTRLLLV EGSLAEKWRD RLAKKVKRWD QKLRRPRKSK 300  
DPVAPIPNKN SNSRQARS

Figure 3. Deduced amino acid sequence of *Xenopus* frazzled protein. SEQ ID NO:3.

Figure 4. Nucleotide sequence of the full-length frazzled cDNA derived from the *Xenopus* organizer. The sense strand of the DNA on top (5' to 3' direction) and the antisense strand on the bottom line (opposite direction). SEQ ID NO:4.

GAATTCCCTT TCACACAGGA CTCCTGGCAG AGGTGAATGG TTAGCCCTAT GGATTTGGTT	60
CTTAAGGGAA AGTGTGTCCT GAGGACCGTC TCCACTTACC AATCGGGATA CCTAAACCAA	
TGTTGATTTT GACACATGAT TGATTGCTTT CAGATAGGAT TGAAGGACTT GGATTTTTAT	120
ACAACTAAAA CTGTGTACTA ACTAACGAAA GTCTATCCTA ACTTCCTGAA CCTAAAAATA	
CTAATTCTGC ACTTTTAAAT TATCTGAGTA ATTGTTTCATT TTGTATTGGA TGGGACTAAA	180
GATTAAGACG TGAAAATTTA ATAGACTCAT TAACAAGTAA AACATAACCT ACCCTGATTT	
GATAAACTTA ACTCCTTGCT TTTGACTTGC CCATAAACTA TAAGGTGGGG TGAGTTGTAG	240
CTATTTGAAT TGAGGAACGA AAACTGAACG GGTATTTGAT ATTCCACCCC ACTCAACATC	
TTGCTTTTAC ATGTGCCCAG ATTTTCCCTG TATTCCCTGT ATTCCCTCTA AAGTAAGCCT	300
AACGAAAATG TACACGGGTC TAAAAGGGAC ATAAGGGACA TAAGGGAGAT TTCATTTCGGA	
ACACATACAG GTTGGGCAGA ATAACAATGT CTCGAACAAG GAAAGTGGAC TCATTACTGC	360
TGTGTATGTC CAACCCGTCT TATTGTTACA GAGCTTGTTT CTTTCACCTG AGTAATGACG	
TACTGGCCAT ACCTGGACTG GCGCTTCTCT TATTACCCAA TGCTTACTGT GCTTCGTGTG	420
ATGACCGGTA TGGACCTGAC CGCGAAGAGA ATAATGGGTT ACGAATGACA CGAAGCACAC	
AGCCTGTGCG GATCCCCATG TGCAAATCTA TGCCATGGAA CATGACCAAG ATGCCCAACC	480
TCGGACACGC CTAGGGGTAC ACGTTTAGAT ACGGTACCTT GTACTGGTTC TACGGGTGGG	
ATCTCCACCA CAGCACTCAA GCCAATGCCA TCCTGGCAAT TGAACAGTTT GAAGGTTTGC	540
TAGAGGTGGT GTCGTGAGTT CGGTTACGGT AGGACCGTTA ACTTGTCAAA CTTCCAAACG	
TGACCACTGA ATGTAGCCAG GACCTTTTGT TCTTTCTGTG TGCCATGTAT GCCCCATTT	600
ACTGGTGACT TACATCGGTC CTGGAAAACA AGAAAGACAC ACGGTACATA CGGGGGTAAA	
GTACCATCGA TTTCCAGCAT GAACCAATTA AGCCTTGCAA GTCCGTGTGC GAAAGGGCCA	660
CATGGTAGCT AAAGGTGCGT CTTGGTTAAT TCGGAACGTT CAGGCACACG CTTTCCCGGT	
GGGCCGGCTG TGAGCCCATC CTCATAAAGT ACCGGCACAC TTGGCCAGAG AGCCTGGCAT	720
CCCGGCCGAC ACTCGGGTAA GAGTATTTCA TGGCCGTGTG AACCAGTCTC TCGGACCGTA	
GTGAAGAGCT GCCCGTATAT GACAGAGGAG TCTGCATCTC CCCAGAGGCT ATCGTCACAG	780
CACCTCTCGA CGGGCATATA CTGTCTCCTC AGACGTAGAG GGGTCTCCGA TAGCAGTGTC	
TGGAACAAGG AACAGATTCA ATGCCAGACT TCTCCATGGA TTCAAACAAT GGAAATTGCG	840
ACCTTGTTCC TTGTCTAAGT TACGGTCTGA AGAGGTACCT AAGTTTGTTA CCTTTAACGC	
GAAGCGGCAG GGAGCACTGT AAATGCAAGC CCATGAAGGC AACCCTAAAAG ACGTATCTCA	900
CTTCGCCGTC CCTCGTGACA TTTACGTTTG GGTACTTCCG TTGGGTTTTT TGCATAGAGT	
AGAATAATTA CAATTATGTA ATCAGAGCAA AAGTGAAAGA GGTGAAAGTG AAATGCCACG	960
TCTTATTAAT GTTAATACAT TAGTCTCGTT TTCACTTTCT CCACTTTTAC TTTACGGTGC	
ACGCAACAGC AATTGTGGAA GTAAAGGAGA TTCTCAAGTC TTCCCTAGTG AACATTCCCTA	1020
TGCGTTGTGCG TTAACACCTT CATTTCTCTT AAGAGTTCAG AAGGGATCAC TTGTAAGGAT	

AAGACACAGT	GACACTGTAC	ACCAACTCAG	GCTGCTTGTG	CCCCAGCTT	GTTGCCAATG	1080
TTCTGTGTCA	CTGTGACATG	TGGTTGAGTC	CGACGAACAC	GGGGGTCGAA	CAACGGTTAC	
AGGAATACAT	AATTATGGGC	TATGAAGACA	AAGAGCGTAC	CAGGCTTCTA	CTAGTGGAAG	1140
TCCTTATGTA	TTAATACCCG	ATACTTCTGT	TTCTCGCATG	GTCCGAAGAT	GATCACCTTC	
GATCCTTGGC	CGAAAAATGG	AGAGATCGTC	TTGCTAAGAA	AGTCAAGCGC	TGGGATCAAA	1200
CTAGGAACCG	GCTTTTACC	TCTCTAGCAG	AACGATTCTT	TCAGTTCGCG	ACCCTAGTTT	
AGCTTCGACG	TCCCAGGAAA	AGCAAAGACC	CCGTGGCTCC	AATTCCCAAC	AAAAACAGCA	1260
TCGAAGCTGC	AGGGTCCTTT	TCGTTTCTGG	GGCACCGAGG	TTAAGGGTTG	TTTTTGTCGT	
ATTCCAGACA	AGCGCGTAGT	TAGACTAACG	GAAAGGTGTA	TGGAACTCT	ATGGACTTTG	1320
TAAGGTCTGT	TCGCGCATCA	ATCTGATTGC	CTTCCACAT	ACCTTTGAGA	TACCTGAAAC	
AAACTAAGAT	TTGCATTGTT	GGAAGAGCAA	AAAAGAAATT	GCACTACAGC	ACGTTATATT	1380
TTTGATTCTA	AACGTAACAA	CCTTCTCGTT	TTTTCTTTAA	CGTGATGTCG	TGCAATATAA	
CTATTGTTTA	CTACAAGAAG	CTGGTTTAGT	TGATTGTAGT	TCTCCTTTCC	TTCTTTTTTT	1440
GATAACAAAT	GATGTTCTTC	GACCAAATCA	ACTAACATCA	AGAGGAAAGG	AAGAAAAAAA	
TTATAACTAT	ATTTGCACGT	GTTCCAGGC	AATTGTTTTA	TTCAACTTCC	AGTGACAGAG	1500
AATATTGATA	TAAACGTGCA	CAAGGGTCCG	TTAACAAAAT	AAGTTGAAGG	TCAGTGTCTC	
CAGTGAAGTGA	ATGTCTCAGC	CTAAGAAGC	TCAATTCATT	TCTGATCAAC	TAATGGTGAC	1560
GTCAGTGAAGT	TACAGAGTCG	GATTTCTTCG	AGTTAAGTAA	AGACTAGTTG	ATTACCACTG	
AAGTGTGTTGA	TACTTGGGGA	AAGTGAAGT	ATTGCAATGG	TAAATCAGAG	AAAAGTTGAC	1620
TTCACAAACT	ATGAACCCCT	TTCAGTTGAT	TAAAGTTACC	ATTAGTCTC	TTTTCAACTG	
CAATGTTGCT	TTTCTGTAG	ATGAACAAGT	GAGAGATCAC	ATTTAAATGA	TGATCACTTT	1680
GTTACAACGA	AAAGGACATC	TACTTGTTC	CTCTCTAGTG	TAAATTTACT	ACTAGTGAAA	
CCATTTAATA	CTTTCAGCAG	TTTTAGTTAG	ATGACATGTA	GGATGCACCT	AAATCTAAAT	1740
GGTAAATTAT	GAAAGTCGTC	AAAATCAATC	TACTGTACAT	CCTACGTGGA	TTTAGATTTA	
ATTTTATCAT	AAATGAAGAG	CTGGTTTAGA	CTGTATGGTC	ACTGTTGGGA	AGGTAAATGC	1800
TAAATAGTA	TTTACTTCTC	GACCAAATCT	GACATACCAG	TGACAACCCCT	TCCATTTACG	
CTACTTTGTC	AATTCTGTTT	TAAAAATTGC	CTAAATAAAT	ATTAAGTCCT	AAATAAAAAA	1860
GATGAAACAG	TTAAGACAAA	ATTTTAAACG	GATTTATTTA	TAATTCAGGA	TTTATTTTTT	
AAAAAAAAAA	AAAAA					
TTTTTTTTTT	TTTTT					

Fig. 4. (Continuation page 2, SEQ ID NO:4).

MLLLFRAIPM LLLGLMVLQT DCEIAQYYID EEEPPGTVIA VLSQHSIFNT TDIPATNFERL	60
MKQFNNSLIG VRESGQLSI MERIDREQIC RQSLHCNLAL DVVSFSKGHF KLLNVKVEVR	120
DINDHSPHFP SEIMHVEVSE SSSVGTRIPL EIAIDEDVGS NSIQNFQISN NSHFSIDVLT	180
RADGVKYADL VLMRELDREI QPTYIMELLA MDGGVPSLSG TAVVNIRVLD FNDNSPVFER	240
STIAVDLVED APLGYLLEL HATDDDEGVN GEIVYGFSTL ASQEVRLFK INSRTGSVTL	300
EGQVDFETKQ TYEFEVQAQD LGPNPLTATC KTVHILDVN DNTPAITITP LTTVNAGVAY	360
IPETATKENF IALISTTDRA SGSNGQVRCT LYGHEHFKLQ QAYEDSYMIV TTSTLDRENI	420
AAYSLTVVAE DLGFPSLTKK KYYTVKVSDE NDNAPVFSKP QYEASILENN APGSYITTVI	480
ARSDSDQNG KVNRYLVDK VMGQSLTTFV SLDADSGVLR AVRSLDYEKL KQLDFEIEAA	540
DNGIPQLSTR VQLNLRIVDQ NDNCPVITNP LLNNGSGEVL LPISAPONYL VFQLKAEDSD	600
EGHNSQLFYT ILRDPSRLFA INKESGEVFL KKQLNSDHSE DLSIVVAVYD LGRPSLSTNA	660
TVKFILTDSF PSNVEVVILQ PSAEEQHQID MSIIFIAVLA GGCALLLLAI FVACTCKKK	720
AGEFKQVPEQ HGTCNEERLL STPSPQSVSS SLSQSESCQL SINTESENCV VSSNQEQHQQ	780
TGIKHSISVP SYHTSGWHLN NCAMSSGHS HMGHISTKVQ WAKEIVTSMT VTLILVENQK	840
RRALSSQCRH KPVLTQMNQ QGSDMPITIS ATESTRVQKM GTAHCMKRA IDCLTL	

**Figure 5.** Deduced amino acid sequence of the *Xenopus* PAPC (paraxial protocadherin) protein. It encodes a member of the cadherin family of transmembrane proteins that has dorsalizing activity when constructs are injected into *Xenopus* embryos. SEQ ID NO:5.

Figure 6. Nucleotide sequence of the full-length PAPC cDNA derived from the *Xenopus* organizer. The sense strand of the DNA is shown in the top line (in the 5' to 3' direction), and the bottom line shows the antisense strand (opposite orientation). SEQ ID NO:6.

GAATTCCCAG	AGATGAACTC	CTTGAGATTG	TTTTAAATGA	CTGCAGGTCT	GGAAGGATTC	60
CTTAAGGGTC	TCTACTTGAG	GAAGTCTAAC	AAAATTTACT	GACGTCCAGA	CCTTCCTAAG	
ACATTGCCAC	ACTGTTTCTA	GGCATGAAAA	AACTGCAAGT	TTCAACTTTG	TTTTTGGTGC	120
TGTAACGGTG	TGACAAAGAT	CCGTACTTTT	TTGACGTTCA	AAGTTGAAAC	AAAAACCACG	
AACTTTGATT	CTTCAAGATG	CTGCTTCTCT	TCAGAGCCAT	TCCAATGCTG	CTGTTGGGAC	180
TTGAAACTAA	GAAGTTCTAC	GACGAAGAGA	AGTCTCGGTA	AGGTTACGAC	GACAACCCCTG	
TGATGGTTTT	ACAAACAGAC	TGTGAAATTG	CCCAGTACTA	CATAGATGAA	GAAGAACCCC	240
ACTACCAAAA	TGTTTGTCTG	ACACTTTAAC	GGGTCATGAT	GTATCTACTT	CTTCTTGGGG	
CTGGCACTGT	AATTGCAGTG	TTGTCACAAC	ACTCCATATT	TAACACTACA	GATATACCTG	300
GACCGTGACA	TTAACGTCAC	AACAGTGTTG	TGAGGTATAA	ATTGTGATGT	CTATATGGAC	
CAACCAATTT	CCGTCTAATG	AAGCAATTTA	ATAATTCCTT	TATCGGAGTC	CGTGAGAGTG	360
GTTGGTTAAA	GGCAGATTAC	TTCGTTAAAT	TATTAAGGGA	ATAGCCTCAG	GCACTCTCAC	
ATGGGCAGCT	GAGCATCATG	GAGAGGATTG	ACCGGGAGCA	AATCTGCAGG	CAGTCCCTTC	420
TACCCGTCGA	CTCGTAGTAC	CTCTCCTAAC	TGGCCCTCGT	TTAGACGTCC	GTCAGGGAAG	
ACTGCAACCT	GGCTTTGGAT	GTGGTCAGCT	TTTCCAAAGG	ACACTTCAAG	CTTCTGAACG	480
TGACGTTGGA	CCGAAACCTA	CACCAAGTCG	AAAGGTTTCC	TGTGAAGTTC	GAAGACTTGC	
TGAAAGTGGA	GGTGAGAGAC	ATTAATGACC	ATAGCCCTCA	CTTTCCAGT	GAAATAATGC	540
ACTTTCACCT	CCACTCTCTG	TAATTACTGG	TATCGGGAGT	GAAAGGGTCA	CTTTATTACG	
ATGTGGAGGT	GTCTGAAAGT	TCCTCTGTGG	GCACCAGGAT	TCCTTTAGAA	ATTGCAATAG	600
TACACCTCCA	CAGACTTTCA	AGGAGACACC	CGTGGTCCTA	AGGAAATCTT	TAACGTTATC	
ATGAAGATGT	TGGGTCCAAC	TCCATCCAGA	ACTTTCAGAT	CTCAAATAAT	AGCCACTTCA	660
TACTTCTACA	ACCCAGGTTG	AGGTAGGTCT	TGAAAGTCTA	GAGTTTATTA	TCGGTGAAGT	
GCATTGATGT	GCTAACCAGA	GCAGATGGGG	TGAAATATGC	AGATTTAGTC	TTAATGAGAG	720
CGTAACTACA	CGATTGGTCT	CGTCTACCCC	ACTTTATACG	TCTAAATCAG	AATTACTCTC	
AACTGGACAG	GGAAATCCAG	CCAACATACA	TAATGGAGCT	ACTAGCAATG	GATGGGGGTG	780
TTGACCTGTC	CCTTTAGGTC	GGTGTATGT	ATTACCTCGA	TGATCGTTAC	CTACCCCCAC	
TACCATCACT	ATCTGGTACT	GCAGTGGTTA	ACATCCGAGT	CCTGGACTTT	AATGATAACA	840
ATGGTAGTGA	TAGACCATGA	CGTCACCAAT	TGTAGGCTCA	GGACCTGAAA	TTACTATTGT	
GCCCAGTGTT	TGAGAGAAGC	ACCATTGCTG	TGGACCTAGT	AGAGGATGCT	CCTCTGGGAT	900
CGGGTCACAA	ACTCTCTTCG	TGGTAACGAC	ACCTGGATCA	TCTCCTACGA	GGAGACCCTA	
ACCTTTTGTT	GGAGTTACAT	GCTACTGACG	ATGATGAAGG	AGTGAATGGA	GAAATTGTTT	960
TGGAATAACAA	CCTCAATGTA	CGATGACTGC	TACTACTTCC	TCACTTACCT	CTTTAACAAA	
ATGGATTACG	CACTTTGGCA	TCTCAAGAGG	TACGTCAGCT	ATTTAAATTT	AACTCCAGAA	1020
TACCTAAGTC	GTGAAACCGT	AGAGTTCTCC	ATGCAGTCGA	TAAATTTTAA	TTGAGGTCTT	



CTGGCAGTGT	TACTCTTGAA	GGCCAAGTTG	ATTTTGAGAC	CAAGCAGACT	TACGAATTTG	1080
GACCGTCACA	ATGAGAACTT	CCGGTTCAAC	TAAAACTCTG	GTTCGTCTGA	ATGCTTAAAC	
AGGTACAAGC	CCAAGATTTG	GGCCCCAACC	CACTGACTGC	TACTTGTAAG	GTAAGTGTTC	1140
TCCATGTTTC	GGTTCTAAAC	CCGGGGTTGG	GTGACTGACG	ATGAACATTT	CATTGACAAG	
ATATACTTGA	TGTAAATGAT	AATACCCAG	CCATCACTAT	TACCCCTCTG	ACTACTGTAA	1200
TATATGAACT	ACATTTACTA	TTATGGGGTC	GGTAGTGATA	ATGGGGAGAC	TGATGACATT	
ATGCAGGAGT	TGCCTATATT	CCAGAAACAG	CCACAAAGGA	GAACCTTTATA	GCTCTGATCA	1260
TACGTCTCA	ACGGATATAA	GGTCTTTGTC	GGTGTTCCT	CTTGAAATAT	CGAGACTAGT	
GCACTACTGA	CAGAGCCTCT	GGATCTAATG	GACAAGTTTC	CTGTACTCTT	TATGGACATG	1320
CGTGATGACT	GTCTCGGAGA	CCTAGATTAC	CTGTTCAAGC	GACATGAGAA	ATACCTGTAC	
AGCACTTTAA	ACTACAGCAA	GCTTATGAGG	ACAGTTACAT	GATAGTTACC	ACCTCTACTT	1380
TCGTGAAATT	TGATGTCGTT	CGAATACTCC	TGTCAATGTA	CTATCAATGG	TGGAGATGAA	
TAGACAGGGA	AAACATAGCA	GCGTACTCTT	TGACAGTAGT	TGCAGAAGAC	CTTGGCTTCC	1440
ATCTGTCCCT	TTTGTATCGT	CGCATGAGAA	ACTGTCATCA	ACGTCTTCTG	GAACCGAAGG	
CCTCATTGAA	GACCAAAAAG	TACTACACAG	TCAAGGTTAG	TGATGAGAAT	GACAATGCAC	1500
GGAGTAACCT	CTGGTTTTTC	ATGATGTGTC	AGTTCCAATC	ACTACTCTTA	CTGTTACGTG	
CTGTATTTTC	TAAACCCAG	TATGAAGCTT	CTATTCTGGA	AAATAATGCT	CCAGGCTCTT	1560
GACATAAAAG	ATTTGGGGTC	ATACTTCGAA	GATAAGACCT	TTTATTACGA	GGTCCGAGAA	
ATATAACTAC	AGTGATAGCC	AGAGACTCTG	ATAGTGATCA	AAATGGCAAA	GTAAATTACA	1620
TATATTGATG	TCACTATCGG	TCTCTGAGAC	TATCACTAGT	TTTACCGTTT	CATTTAATGT	
GACTTGTGGA	TGCAAAAGTG	ATGGGGCCAGT	CACTAAACAAC	ATTTGTTTCT	CTTGATGCGG	1680
CTGAACACCT	ACGTTTTTCAC	TACCCGGTCA	GTGATTGTTG	TAAACAAAGA	GAAGTACGCC	
ACTCTGGAGT	ATTGAGAGCT	GTTAGGTCTT	TAGACTATGA	AAAACCTAAA	CAACTGGATT	1740
TGAGACCTCA	TAAGTCTCGA	CAATCCAGAA	ATCTGATACT	TTTTGAATTT	GTTGACCTAA	
TTGAAATTGA	AGCTGCAGAC	AATGGGATCC	CTCAACTCTC	CACTCGCGTT	CAACTAAATC	1800
AACTTTAACT	TCGACGCTCG	TTACCCTAGG	GAGTTGAGAG	GTGAGCGCAA	GTTGATTTAG	
TCAGAATAGT	TGATCAAAAT	GATAATTGCC	CTGTGATAAC	TAATCCTCTT	CTTAATAATG	1860
AGTCTTATCA	ACTAGTTTTA	CTATTAACGG	GACACTATTG	ATTAGGAGAA	GAATTATTAC	
GCTCGGGTGA	AGTTCTGCTT	CCCATCAGCG	CTCCTCAAAA	CTATTTAGTT	TTCCAGCTCA	1920
CGAGCCCACT	TCAAGACGAA	GGGTAGTCGC	GAGGAGTTTT	GATAAATCAA	AAGGTCGAGT	
AAGCCGAGGA	TTCAGATGAA	GGGCACAAC	CCCAGCTGTT	CTATACCATA	CTGAGAGATC	1980
TTCCGCTCCT	AAGTCTACTT	CCCGTGTTGA	GGGTCGACAA	GATATGGTAT	GAAGTCTCTAG	
CAAGCAGATT	GTTTGCCATT	AACAAAGAAA	GTGGTGAAGT	GTTCTTGAAA	AAACAATTAA	2040
GTTCGTCTAA	CAAGCGGTAA	TTGTTTCTTT	CACCACTTCA	CAAGGACTTT	TTTGTTAATT	
ACTCTGACCA	TTCAGAGGAC	TTGAGCATAG	TAGTTGCAGT	GTATGACTTG	GGAAGACCTT	2100
TGAGACTGGT	AAGTCTCCTG	AATCGTATC	ATCAACGTCA	CATACTGAAC	CCTTCTGGAA	
CATTATCCAC	CAATGCTACA	GTTAAATTCA	TCCTCACCAG	CTCTTTTCCT	TCTAACGTTG	2160
GTAATAGGTG	GTTACGATGT	CAATTTAAGT	AGGAGTGGCT	GAGAAAAGGA	AGATTGCAAC	

Fig. 6. (Continuation page 2, SEQ ID NO:6).

AAGTCGTTAT TTTGCAACCA TCTGCAGAAG AGCAGCACCA GATCGATATG TCCATTATAT 2220  
TTCAGCAATA AAACGTTGGT AGACGTCTTC TCGTCGTGGT CTAGCTATAC AGGTAATATA  
  
TCATTGCAGT GCTGGCTGGT GGTGTGTGCTT TGCTACTTTT GGCCATCTTT TTTGTGGCCT 2280  
AGTAACGTCA CGACCGACCA CCAACACGAA ACGATGAAAA CCGGTAGAAA AAACACCGGA  
  
GTACTTGTA AAGAAAGCT GGTGAATTTA AGCAGGTACC TGAACAACAC GGAACATGCA 2340  
CATGAACATT TTTCTTTTGA CCACTTAAAT TCGTCCATGG ACTTGTGTG CCTTGTACGT  
  
ATGAAGAACG CCTGTTAAGC ACCCATCTC CCCAGTCGGT CTCTTCTTCT TTGTCTCAGT 2400  
TACTTCTTGC GGACAATTGC TGGGGTAGAG GGGTCAGCCA GAGAAGAAGA AACAGAGTCA  
  
CTGAGTCATG CCAACTCTCC ATCAATACTG AATCTGAGAA TTGCAGCGTG TCCTCTAACC 2460  
GACTCAGTAC GGTTGAGAGG TAGTTATGAC TTAGACTCTT AACGTCGCAC AGGAGATTGG  
  
AAGAGCAGCA TCAGCAAACA GGCATAAAGC ACTCCATCTC TGTACCATCT TATCACACAT 2520  
TTCTCGTCGT AGTCGTTTGT CCGTATTTTC TGAGGTAGAG ACATGGTAGA ATAGTGTGTA  
  
CTGGTTGGCA CCTGGACAAT TGTGCAATGA GCATAAGTGG ACATTCTCAC ATGGGGCACA 2580  
GACCAACCGT GGACCTGTGA ACACGTTACT CGTATTCACC TGTAAGAGTG TACCCCGTGT  
  
TTAGTACAAA GGTACAGTGG GCAAAGGAGA TAGTGACTTC AATGACAGTG ACTCTGATAC 2640  
AATCATGTTT CCATGTCACC CGTTTCTCT ATCACTGAAG TTAGTGTAC TGAGACTATG  
  
TAGTGGAGAA TCAGAAAAGA AGAGCATTGA GCAGCCAATG CAGGCACAAG CCAGTGCTCA 2700  
ATCACCTCTT AGTCTTTTCT TCTCGTAACT CGTCGGTTAC GTCCGTGTTT GGTACAGAGT  
  
ATACACAGAT GAATCAGCAG GGTTCGACA TGCCGATAAC TATTCAGCC ACCGAATCAA 2760  
TATGTGTCTA CTTAGTCGTC CCAAGGCTGT ACGGCTATTG ATAAAGTCGG TGGCTTAGTT  
  
CAAGGGTCCA GAAATGGGA ACTGCACATT GCAATATGAA AAGGGCTATA GACTGTCTTA 2820  
GTTCCAGGT CTTTACCCT TGACGTGTAA CGTTTACTT TTCCCGATAT CTGACAGAAT  
  
CTCTGTAGCT CCTGTATATT ACAATACCTA CCATGCAAGA ATGCCTAACC TGCACATACC 2880  
GAGACATCGA GGACATATAA TGTTATGGAT GGTACGTTCT TACGGATTGG ACGTGTATGG  
  
GAACCATACC CTTAGAGACC CTTATTACCA TATCAATAAT CCTGTTGCTA ATCGGATGCA 2940  
CTTGGTATGG GAATCTCTGG GAATAATGGT ATAGTTATTA GGACAACGAT TAGCCTACGT  
  
GGCGGAATAT GAAAGAGATT TAGTCAACAG AAGTGCAACG TTATCTCCGC AGAGATCGTC 3000  
CCGCTTATA CTTTCTCTAA ATCAGTTGTC TTCACGTTGC AATAGAGGCG TCTCTAGCAG  
  
TAGCAGATAC CAAGAATTCA ATTACAGTCC GCAGATATCA AGACAGCTTC ATCCTTCAGA 3060  
ATCGTCTATG GTTCTTAAGT TAATGTCAGG CGTCTATAGT TCTGTGGAAG TAGGAAGTCT  
  
AATTGCTACA ACCTTTTAAAT CATTAGGCAT GCAAGTGAGA ATGCACAAAG GCAAGTGCTT 3120  
TTAACGATGT TGGAAAATTA GTAATCGTA CGTTCACTCT TACGTGTTTC CGTTCACGAA  
  
TAGCATGAAA GCTAAATATA TGGAGTCTCC CTTTTCCCTC TGATGGATGG GGGGAGACAC 3180  
ATCGTACTTT CGATTATAT ACCTCAGAGG GGAAAGGGAG ACTACCTACC CCCCTCTGTG  
  
AGGACAGTGC ATAAATATAC AGCTGCTTTC TATTTGCATT TCACTTGGGA ATTTTTTGTT 3240  
TCCTGTCACG TATTTATATG TCGACGAAAG ATAAACGTAA AGTGAACCCT TAAAAACAA  
  
TTTTTTACAT ATTTATTTTT CCTGAATTGA ATGTGACATT GTCCTGTCAC CTAAC TAGCA 3300  
AAAAATGTA TAAATAAAAA GGACTTAACT TACTGTGTA CAGGACAGTG GATTGATCGT

Fig. 6. (Continuation page 3, SEQ ID NO:6).

ATTAAATCCA	CAGACCTACA	GTCAAATATT	TGAGGGCCCC	TGAAACAGCA	CATCAGTCAG	3360
TAATTTAGGT	GTCTGGATGT	CAGTTTATAA	ACTCCCGGGG	ACTTTGTCGT	GTAGTCAGTC	
GACCTAAAGT	GGCCTTTTTA	CTTTTAGCAG	CTCCTGGGTC	TGCCCTCTGT	GTTAATCAGC	3420
CTGGATTTCA	CCGGAATAAT	GAAAATCGTC	GAGGACCCAG	ACGGGAGACA	CAATTAGTCG	
CCCTGGTCAA	GTCCTGAGTA	GGATCATGGC	GTTTTTATAT	GCATCTCACC	TACTTTGGAC	3480
GGGACCAGTT	CAGGACTCAT	CCTAGTACCG	CAAAAATATA	CGTAGAGTGG	ATGAAACCTG	
GTGATTTACA	CATAATAGGA	AACGCTTGGT	TTCAGTGAAG	TCTGTGTTGT	ATATATTCTG	3540
CACTAAATGT	GTATTATCCT	TTGCGAACCA	AAGTCACTTC	AGACACAACA	TATATAAGAC	
TTATATACAC	GCATTTTGTG	TTTGTGTATA	TATTTCAAGT	CCATTCAGAT	ATGTGTATAT	3600
AATATATGTG	CGTAAACAC	AAACACATAT	ATAAAGTTCA	GGTAAGTCTA	TACACATATA	
AGTGCAGACC	TTGTAAATTA	AATATTCTGA	TACTTTTTCC	TCAATAAATA	TTTAAAT	
TCACGTCTGG	AACATTTAAT	TTATAAGACT	ATGAAAAGG	AGTTATTTAT	AAATTTA	

Fig. 6. (Continuation page 4, SEQ ID NO:6).

MVCCGPGRML LGWAGLLVLA ALCLLQVPGA QAAACEPVRI PLCKSLPWNM TKMPNHLHHS 60  
TQANAILAME QFEGLLGTHC SPDLLFFLCA MYAPICTIDF QHEPIKPCKS VCERARQGCE 120  
PILIKYRHSW PESLACDELP VYDRGVCISP EAIVTADGAD FPMDSSTGHC RGASSERCKC 180  
KPV RATQKTY FRNNYNYVIR AKVKEVKMKC HDVTAVVEVK EILKASLVNI PRDTVNLYTT 240  
SGCLCPPLTV NEEYVIMGYE DEERSRLLLV EGSIAEKWKD RLGKKVKRWD MKLRHLGLGK 300  
TDASDSTQNQ KSGRNSNPRP ARS.

Figure 7. Deduced amino acid sequence of mouse FRZB-1 protein. SEQ ID NO:7.

Figure 8. Nucleotide sequence of the full-length mouse FRZB-1 cDNA. SEQ ID NO:8.

AAGCCTGGGA CCATGGTCTG CTGCGGCCCG GGACGGATGC TGCTAGGATG GGCCGGGTTG	60
TTCGGACCCT GGTACCAGAC GACGCCGGGC CCTGCCTACG ACGATCCTAC CCGGCCCAAC	
CTAGTCCTGG CTGCTCTCTG CCTGCTCCAG GTGCCCCGAG CTCAGGCTGC AGCCTGTGAG	120
GATCAGGACC GACGAGAGAC GGACGAGGTC CACGGGCCTC GAGTCCGACG TCGGACACTC	
CCTGTCCGCA TCCCGCTGTG CAAGTCCCTT CCCTGGAACA TGACCAAGAT GCCCAACCAC	180
GGACAGGCGT AGGGCGACAC GTTCAGGGAA GGGACCTTGT ACTGGTTCTA CGGGTGGTGT	
CTGCACCACA GCACCCAGGC TAACGCCATC CTGGCCATGG AACAGTTCGA AGGGCTGCTG	240
GACGTGGTGT CGTGGGTCCG ATTGCGGTAG GACCGGTACC TTGTCAAGCT TCCCACGAC	
GGCACCCACT GCAGCCCGGA TCTTCTCTTC TTCCTCTGTG CAATGTACGC ACCCATTTCG	300
CCGTGGGTGA CGTCGGGCCT AGAAGAGAAG AAGGAGACAC GTTACATGCG TGGGTAAACG	
ACCATCGACT TCCAGCACGA GCCCATCAAG CCCTGCAAGT CTGTGTGTGA GCGCGCCCGA	360
TGGTAGCTGA AGGTCGTGCT CGGGTAGTTC GGGACGTTCA GACACACACT CGCGCGGGCT	
CAGGGCTGCG AGCCCATTCCT CATCAAGTAC CGCCACTCGT GGCCGGAAG CTTGGCCTGC	420
GTCCCGACGC TCGGGTAAGA GTAGTTCATG GCGGTGAGCA CCGGCCTTTC GAACCGGACG	
GACGAGCTGC CGGTGTACGA CCGCGGCGTG TGCATCTCTC CTGAGGCCAT CGTCACCGCG	480
CTGCTCGACG GCCACATGCT GGCGCCGCAC ACGTAGAGAG GACTCCGGTA GCAGTGGCGC	
GACGGAGCGG ATTTTCCTAT GGATTCAAGT ACTGGACACT GCAGAGGGGC AAGCAGCGAA	540
CTGCCTCGCC TAAAAGGATA CCTAAGTTCA TGACCTGTGA CGTCTCCCCG TTCGTCGCTT	
CGTTGCAAAT GTAAGCCTGT CAGAGCTACA CAGAAGACCT ATTTCCGGAA CAATTACAAC	600
GCAACGTTTA CATTCGGACA GTCTCGATGT GTCTTCTGGA TAAAGGCCTT GTTAATGTTG	
TATGTCATCC GGGCTAAAGT TAAAGAGGTA AAGATGAAAT GTCATGATGT GACCGCCGTT	660
ATACAGTAGG CCCGATTTC AATTCTCCAT TTCTACTTTA CAGTACTACA CTGGCGGCAA	
GTGGAAGTGA AGGAAATTCT AAAGGCATCA CTGGTAAACA TTCCAAGGGA CACCGTCAAT	720
CACCTTCACT TCCTTTAAGA TTTCCGTAGT GACCATTTGT AAGGTTCCCT GTGGCAGTTA	
CTTTATACCA CCTCTGGCTG CCTCTGTCCT CCACTTACTG TCAATGAGGA ATATGTCATC	780
GAAATATGGT GGAGACCGAC GGAGACAGGA GGTGAATGAC AGTTACTCCT TATACAGTAG	
ATGGGCTATG AAGACGAGGA ACGTTCCAGG TTA CTCTTGG TAGAAGGCTC TATAGCTGAG	840
TACCCGATAC TTCTGCTCCT TGCAAGGTCC AATGAGAACC ATCTTCCGAG ATATCGACTC	
AAGTGGAAGG ATCGGCTTGG TAAGAAAGTC AAGCGCTGGG ATATGAAACT CCGACACCTT	900
TTACCTTCC TAGCCGAACC ATTCTTTTCA TTCGCGACCC TATACTTTGA GGCTGTGGAA	
GGACTGGGTA AAAGTATGTC TAGCGATTCC ACTCAGAATC AGAAGTCTGG CAGGAACTCT	960
CCTGACCCAT TTTGACTACG ATCGCTAAGG TGAGTCTTAG TCTTCAGACC GTCCTTGAGA	

AATCCCCGGC	CAGCACGCAG	CTAAATCCTG	AAATGTAAAA	GGCCACACCC	ACGGACTCCC	1020
TTAGGGGCGG	GTCGTGCGTC	GATTTAGGAC	TTTACATTTT	CCGGTGTGGG	TGCCTGAGGG	
TTCTAAGACT	GGCGCTGGTG	GACTAACAAA	GGAAAACCGC	ACAGTTGTGC	TCGTGACCGA	1080
AAGATTCTGA	CCGCGACCAC	CTGATTGTTT	CCTTTTGGCG	TGTCAACACG	AGCACTGGCT	
TTGTTTACCG	CAGACACCGC	GTGGCTACCG	AAGTTACTTC	CGGTCCCCTT	TCTCCTGCTT	1140
AACAAATGGC	GTCTGTGGCG	CACCGATGGC	TTCAATGAAG	GCCAGGGGAA	AGAGGACGAA	
CTTAATGGCG	TGGGGTTAGA	TCCTTTAATA	TGTTATATAT	TCTGTTTCAT	CAATCACGTG	1200
GAATTACCGC	ACCCCAATCT	AGGAAATTAT	ACAATATATA	AGACAAAGTA	GTTAGTGCAC	
GGGACTGTTT	TTTTGCAACC	AGAATAGTAA	ATTAAATATG	TTGATGCTAA	GGTTTCTGTA	1260
CCCTGACAAG	AAAACGTTGG	TCTTATCATT	TAATTTATAC	AACTACGATT	CCAAAGACAT	
CTGGACTCCC	TGGGTTTAAT	TTGGTGTTCT	GTACCCTGAT	TGAGAATGCA	ATGTTTCATG	1320
GACCTGAGGG	ACCCAAATTA	AACCACAAGA	CATGGGACTA	ACTCTTACGT	TACAAAGTAC	
TAAAGAGAGA	ATCCTGGTCA	TATCTCAAGA	ACTAGATATT	GCTGTAAGAC	AGCCTCTGCT	1380
ATTTCTCTCT	TAGGACCACT	ATAGAGTTCT	TGATCTATAA	CGACATTCTG	TCGGAGACGA	
GCTGCGCTTA	TAGTCTTGTT	TTTGTATGCC	TTTGTCCATT	TCCCTCATGC	TGTGAAAGTT	1440
CGACGCGAAT	ATCAGAACAC	AAACATACGG	AAACAGGTAA	AGGGAGTACG	ACACTTTCAA	
ATACATGTTT	ATAAAGGTAG	AACGGCATT	TGAAATCAGA	CACTGCACAA	GCAGAGTAGC	1500
TATGTACAAA	TATTTCCATC	TTGCCGTAAA	ACTTTAGTCT	GTGACGTGTT	CGTCTCATCG	
CCAACACCAG	GAAGCATTTA	TGAGGAAACG	CCACACAGCA	TGACTTATTT	TCAAGATTGG	1560
GGTTGTGGTC	CTTCGTAAAT	ACTCCTTTGC	GGTGTGTCGT	ACTGAATAAA	AGTTCTAACC	
CAGGCAGCAA	AATAAATAGT	GTTGGGAGCC	AAGAAAAGAA	TATTTTGCCT	GGTTAAGGGG	1620
GTCCGTCGTT	TTATTTATCA	CAACCCTCGG	TTCTTTTCTT	ATAAAACGGA	CCAATTCCCC	
CACACTGGAA	TCAGTAGCCC	TTGAGCCATT	AACAGCAGTG	TTCTTCTGGC	AAGTTTTTGA	1680
GTGTGACCTT	AGTCATCGGG	AACTCGGTAA	TTGTCTGCAC	AAGAAGACCG	TTCAAAAAC	
TTTGTTTCATA	AATGTATTCA	CGAGCATTAG	AGATGAACTT	ATAACTAGAC	ATCTGTTGTT	1740
AAACAAGTAT	TTACATAAGT	GCTCGTAATC	TCTACTTGAA	TATTGATCTG	TAGACAACAA	
ATCTCTATAG	CTCTGCTTCC	TTCTAAATCA	AACCCATTGT	TGGATGCTCC	CTCTCCATTC	1800
TAGAGATATC	GAGACGAAGG	AAGATTTAGT	TTGGGTAACA	ACCTACGAGG	GAGAGGTAAG	

ATAAATAAAT	TTGGCTTGCT	GTATTGGCCA	GGAAAAGAAA	GTATTAAAGT	ATGCATGCAT	1860
TATTTATTTA	AACCGAACGA	CATAACCGGT	CCTTTTCTTT	CATAATTTCA	TACGTACGTA	
GTGCACCAGG	GTGTTATTTA	ACAGAGGTAT	GTAACCTCTAT	AAAAGACTAT	AATTTACAGG	1920
CACGTGGTCC	CACAATAAAT	TGTCTCCATA	CATTGAGATA	TTTTCTGATA	TTAAATGTCC	
ACACGGAAAT	GTGCACATTT	GTTTACTTTT	TTTCTTCCTT	TTGCTTTGGG	CTTGTGATTT	1980
TGTGCCTTTA	CACGTGTAAA	CAAATGAAAA	AAAGAAGGAA	AACGAAACCC	GAACACTAAA	
TGGTTTTTGG	TGTGTTTATG	TCTGTATTTT	GGGGGGTGGG	TAGGTTTAAG	CCATTGCACA	2040
ACCAAAAACC	ACACAAATAC	AGACATAAAA	CCCCCACC	ATCCAAATTC	GGTAACGTGT	
TTCAAGTTGA	ACTAGATTAG	AGTAGACTAG	GCTCATTGGC	CTAGACATTA	TGATTTGAAT	2100
AAGTTCAACT	TGATCTAATC	TCATCTGATC	CGAGTAACCG	GATCTGTAAT	ACTAACTTA	
TTGTGTTGTT	TAATGCTCCA	TCAAGATGTC	TAATAAAAGG	AATATGGTTG	TCAACAGAGA	2160
AACACAACAA	ATTACGAGGT	AGTTCTACAG	ATTATTTTCC	TTATACCAAC	AGTTGTCTCT	
CGACAACAAC	AACAAA					
GCTGTTGTTG	TTGTTT					

MVCGSPGGML LLRAGLLALA ALCLLRVPGA RAAACEPVRI PLCKSLPWNM TKMPNHLHHS	60
TQANAILAIE QFEGLLGTHC SPDLLFFLCA MYAPICTIDF QHEPIKPCKS VCERARQGCE	120
PILIKYRHSW PENLACEELP VYDRGVCISP EAIVTADGAD FPMDSNGNC RGASSERCKC	180
KPIRATQKTY FRNNYNYVIR AKVKEIKTKC HDVTAVVEVK EILKSSLVNI PRDTVNLYTS	240
SGCLCPPLNV NEEYIIMGYE DEERSRLLLV EGSIAEKWKD RLGKKVKRWD MKLRHLGLSK	300
SDSSNSDSTQ SQKSGRNSNP RQARN.	

Figure 9. Deduced amino acid sequence of human FRZB-1 protein. SEQ ID NO:9.



**Figure 10.** Nucleotide sequence of the full-length human FRZB-1 cDNA. SEQ ID NO:10.  
This sequence was assembled from public ESTs from the Genbank database  
(accession numbers: H18848, R63748, W38677, W44760, H38379 and N71244).

GGCGGAGCGG GCCTTTTGGC GTCCACTGCG CGGCTGCACC CTGCCCCATC TGCCGGGATC	60
CCGCCTCGCC CGGAAAACCG CAGGTGACGC GCCGACGTGG GACGGGGTAG ACGGCCCTAG	
ATGGTCTGCG GCAGCCCGGG AGGGATGCTG CTGCTGCGGG CCGGGCTGCT TGCCCTGGCT	120
TACCAGACGC CGTCGGGGCC TCCCTACGAC GACGACGCCC GGCCCGACGA ACGGGACCGA	
GCTCTCTGCC TGCTCCGGGT GCGCGGGGCT CGGGCTGCAG CCTGTGAGCC CGTCCGCATC	180
CGAGAGACGG ACGAGGCCCA CGGGCCCCGA GCCCGACGTC GGACACTCGG GCAGGCGTAG	
CCCCGTGTGCA AGTCCCTGCC CTGGAACATG ACTAAGATGC CCAACCACCT GCACCACAGC	240
GGGGACACGT TCAGGGACGG GACCTTGATC TGATTCTACG GGTGTGGTGA CTGGTGTGTC	
ACTCAGGCCA ACGCCATCCT GGCCATCGAG CAGTTCGAAG GTCTGCTGGG CACCCACTGC	300
TGAGTCCGGT TGCGGTAGGA CCGGTAGCTC GTCAAGCTTC CAGACGACCC GTGGGTGACG	
AGCCCCGATC TGCTCTTCTT CCTCTGTGCC ATGTACGCGC CCATCTGCAC CATTGACTTC	360
TCGGGGCTAG ACGAGAAGAA GGAGACACGG TACATGCGCG GGTAGACGTG GTAACCTGAA	
CAGCACGAGC CCATCAAGCC CTGTAAGTCT GTGTGCGAGC GGGCCCGGCA GGGCTGTGAG	420
GTCGTGCTCG GGTAGTTCGG GACATTCAGA CACACGCTCG CCCGGGCCGT CCCGACACTC	
CCCATACTCA TCAAGTACCG CCACTCGTGG CCGGAGAACC TGGCCTGCGA GGAGCTGCCA	480
GGGTATGAGT AGTTCATGGC GGTGAGCACC GGCCTCTTGG ACCGGACGCT CCTCGACGGT	
GTGTACGACA GGGGCGTGTG CATCTCTCCC GAGGCCATCG TTA CTGCGGA CGGAGCTGAT	540
CACATGCTGT CCCCACACAC GTAGAGAGGG CTCCGGTAGC AATGACGCT GCCTCGACTA	
TTTCCTATGG ATTCTAGTAA CGGAACTGT AGAGGGGCAA GCAGTGAACG CTGTAAATGT	600
AAAGGATACC TAAGATCATT GCCTTTGACA TCTCCCCGTT CGTCACTTGC GACATTTACA	
AAGCCTATTA GAGCTACACA GAAGACCTAT TTCCGGAACA ATTACAACCTA TGTCATTCCG	660
TTCCGATAAT CTCGATGTGT CTTCTGGATA AAGGCCTTGT TAATGTTGAT ACAGTAAGCC	
GCTAAAGTTA AAGAGATAAA GACTAAGTGC CATGATGTGA CTGCAGTAGT GGAGGTGAAG	720
CGATTTCAAT TTCTCTATTT CTGATTCACG GTACTACACT GACGTCATCA CCTCCACTTC	
GAGATTCTAA AGTCCTCTCT GGTAAACATT CCACGGGACA CTGTCAACCT CTATACCAGC	780
CTCTAAGATT TCAGGAGAGA CCATTTGTAA GGTGCCCTGT GACAGTTGGA GATATGGTGC	
TCTGGCTGCC TCTGCCCTCC ACTTAATGTT AATGAGGAAT ATATCATCAT GGGCTATGAA	840
AGACCGACGG AGACGGGAGG TGAATTACAA TTA CTCTTA TATAGTAGTA CCCGATACTT	

GATGAGGAAC	GTTCCAGATT	ACTCTTGGTG	GAAGGCTCTA	TAGCTGAGAA	GTGGAAGGAT	900
CTACTCCTTG	CAAGGTCTAA	TGAGAACCAC	CTTCCGAGAT	ATCGACTCTT	CACCTTCCTA	
CGACTCGGTA	AAAAAGTTAA	GCGCTGGGAT	ATGAAGCTTC	GTCATCTTGG	ACTCAGTAAA	960
GCTGAGCCAT	TTTTTCAATT	CGCGACCCTA	TACTTTCGAAG	CAGTAGAACC	TGAGTCATTT	
AGTGATTCTA	GCAATAGTGA	TTCCACTCAG	AGTCAGAAGT	CTGGCAGGAA	CTCGAACCCC	1020
TCACTAAGAT	CGTTATCACT	AAGGTGAGTC	TCAGTCTTCA	GACCGTCCTT	GAGCTTGGGG	
CGGCAAGCAC	GCAACTAAAT	CCCGAAATAC	AAAAAGTAAC	ACAGTGGACT	TCCTATTAAG	1080
GCCGTTTCGTG	CGTTGATTTA	GGGCTTTATG	TTTTTTCATTG	TGTCACCTGA	AGGATAATTC	
ACTTACTTTGC	ATTGCTGGAC	TAGCAAAGGA	AAATTGCACT	ATTGCACATC	ATATTCTATT	1140
TGAATGAACG	TAACGACCTG	ATCGTTTCTT	TTTAACGTGA	TAACGTGTAG	TATAAGATAA	
GTTTACTATA	AAAATCATGT	GATAACTGAT	TATTACTTCT	GTTTCTCTTT	TGGTTTCTGC	1200
CAAATGATAT	TTTTAGTACA	CTATTGACTA	ATAATGAAGA	CAAAGAGAAA	ACCAAAGACG	
TTCTCTCTTC	TCTCAACCCC	TTTGTAATGG	TTTGGGGGCA	GACTCTTAAG	TATATTGTGA	1260
AAGAGAGAAG	AGAGTTGGGG	AAACATTACC	AAACCCCCGT	CTGAGAATTC	ATATAACACT	
GTTTTCTATT	TCACTAATCA	TGAGAAAAAC	TGTTCTTTTG	CAATAATAAT	AAATTAAACA	1320
CAAAAGATAA	AGTGATTAGT	ACTCTTTTTG	ACAAGAAAAC	GTTATTATTA	TTTAATTTGT	
TGCTGTTACC	AGAGCCTCTT	TGCTGAGTCT	CCAGATGTTA	ATTTACTTTC	TGCACCCCAA	1380
ACGACAATGG	TCTCGGAGAA	ACGACTCAGA	GGTCTACAAT	TAAATGAAAG	ACGTGGGGTT	
TTGGGAATGC	AATATTGGAT	GAAAAGAGAG	GTTTCTGGTA	TTACAGAGAA	GCTAGATATG	1440
AACCCTTACG	TTATAACCTA	CTTTTCTCTC	CAAAGACCAT	AAGTGCTTTT	CGATCTATAC	
CCTTAAAACA	TACTCTGCCG	ATCTAATTAC	AGCCTTATTT	TTGTATGCCT	TTTGGGCATT	1500
GGAATTTTGT	ATGAGACGGC	TAGATTAATG	TCGGAATAAA	AACATACGGA	AAACCCGTAA	
CTCCTCATGC	TTAGAAAGTT	CCAAATGTTT	ATAAAGGTAA	AATGGCAGTT	TGAAGTCAAA	1560
GAGGAGTACG	AATCTTTCAA	GGTTTACAAA	TATTTCCATT	TTACCGTCAA	ACTTCAGTTT	
TGTCACATAG	GCAAAGCAAT	CAAGCACCAG	GAAGTGTTTA	TGAGGAAACA	ACACCCAAGA	1620
ACAGTGTATC	CGTTTCGTTA	GTTTCGTGGT	CTTCACAAAT	ACTCCTTTGT	TGTGGGGTCT	
TGAATTATTT	TTGAGACTGT	CAGGAAGTAA	AATAAATAGG	AGCTTAAGAA	AGAACATTTT	1680
ACTTAATAAA	AACTCTGACA	GTCCTTCATT	TTATTTATCC	TCGAATTCTT	TCTTGTAATA	
GCCTGATTGA	GAAGCACAAC	TGAAACCAGT	AGCCGCTGGG	GTGTTAATGG	TAGCATTCTT	1740
CGGACTAACT	CTTCGTGTTG	ACTTTGGTCA	TCGGCGACCC	CACAATTACC	ATCGTAAGAA	
CTTTTGGCCAA	TACATTTGAT	TTGTTTCATG	ATATATTAAT	CAGCATTAGA	GAAATGAATT	1800
GAAAACCGTT	ATGTAAACTA	AACAAGTACT	TATATAATTA	GTCGTAATCT	CTTTACTTAA	
ATAACTAGAC	ATCTGCTGTT	ATCACCATAG	TTTTGTTTAA	TTTGCTTCCT	TTTAAATAAA	1860
TATTGATCTG	TAGACGACAA	TAGTGGTATC	AAAACAAATT	AAACGAAGGA	AAATTTATTT	
CCCATTGGTG	AAAGTCAAAA	AAAAAAAAAA	AAA			
GGGTAACCAC	TTTCAGTTTT	TTTTTTTTTT	TTT			